

REMARKS

This application has been carefully reviewed in light of the Office Action dated September 8, 2003 (Paper No. 11). Claims 1 to 27 are in the application, of which Claims 1, 13, 25 and 26 are independent. Claims 1 to 3, 5, 13 to 15, 17, 25 and 26 have been amended herein. Reconsideration and further examination are respectfully requested.

Applicants gratefully acknowledge the indication in the Office Action that Claims 4, 5, 16 and 17 recite allowable subject matter, and would be allowable if rewritten in independent form. Claims 5 and 17 are being amended herein to refer to "scanning records", in conformance with amendments made to independent Claims 1 and 13. The allowable status of Claims 5 and 17 is not seen to be impacted in any way by the amendments made to these claims. Since it is believed that the claims from which these claims depend are also allowable over the applied art, Claims 4, 5, 16 and 17 have not been rewritten.

By the Office Action, Claims 1 to 3, 6 to 15 and 18 to 27 were rejected under 35 U.S.C. § 102(b) over U.S. Patent 5,767,876 (Koike). Reconsideration and withdrawal of the rejection of these claims are respectfully requested, for the reasons set forth below.

The present invention generally concerns an ink-jet recording technique with which a high recording grade is achieved for both black images and color images. More specifically, ink-jet recording is performed using a plurality of recording heads and a plurality of recording scans performed in a given recording area. For each of the recording heads, a mask pattern is used to generate image data for each of the recording scans such that black image data are allotted to each recording scan, and color image data is allotted to

each recording scan. The mask pattern used for black image data and color image data during a given recording scan has different allotment rates.

By virtue of this arrangement, the amount of black ink and color ink impacting a recording medium during each recording scan is controllable to lessen bleeding between the black and color inks and the frequency with which black ink and color ink simultaneously impact the recording medium can be reduced thereby reducing the possibility that the black and color inks will come into contact causing bleeding.

Turning to the specific language of the claims, Claim 1 defines a color ink-jet recording apparatus using a black recording head that ejects black ink on the basis of black image data and color recording heads that eject color ink on the basis of color image data, the color ink permeating through a recording medium at a higher speed than the black ink. The apparatus, which comprises a data generating means, completes a record image in a predetermined recording area on the recording medium by causing the recording heads to perform a plurality of recording scans in the predetermined recording area. The data generating means uses mask patterns for the plurality of recording heads to generate image data for each of the recording scans corresponding to the predetermined recording area, so that black image data corresponding to the predetermined recording area are allotted to each of the recording scans, and color image data corresponding to the predetermined recording area are allotted to each of the recording scans. According to the present invention, each of the mask patterns for the black image data and color image data used during the same recording scan has different allotment rates.

The applied art, namely Koike, is not seen to disclose or to suggest each and every feature of the claims, at least with respect to using mask patterns for the plurality of

recording heads for each recording scan such that black image data and color image data are allotted to each recording scan for a predetermined recording area, and each of the mask patterns for the black image data and the color image data used during the same recording scan has different allotment rates.

Koike is seen to describe an ink jet recording technique in which each pixel consists of a matrix of dots of low-permeability black ink, dots of high-permeability color ink, and blank dots, where some portion of the data that is to be printed using the low-permeability black ink is converted to data which is printed using the high-permeability color inks. (See Koike, Abstract and col. 4, line 10 to col. 8, line 55) Koike is seen to describe using multiple scans, however, each of the scans is not seen to be used for both color and black inks. (See Koike, col. 7, lines 25 to 50)

Reference is made to Figures 38 to 42, and the description commencing at col. 23, lines 53, of Koike. In Figure 38, only cyan is recorded in a first scan and then only black is recorded in the second scan. In Figure 39, only cyan and magenta, and no black, are recorded in a first scan and then only black is recorded in a subsequent scan. Thus, in the first scan depicted in Figures 38 and 39, high-permeability color ink dots are recorded and no low-permeability black ink is recorded, and conversely low-permeability color ink is recorded and no high-permeability color ink is recorded in the second scan. Thus, in the example shown in Figures 46 to 48, Koike is not seen to disclose black image data and color image data in each of a plurality of recording scans.

Referring to Figures 46 to 48, cyan is recorded in a first scan without recording black, as depicted in Figure 46, magenta, cyan and no black is recorded in a second scan, as depicted in Figure 47, and yellow and black are recorded in a third scan

depicted in Figure 48. Thus, in the example shown in Figures 46 to 48, Koike is not seen to disclose both black image data and color image data in each of a plurality of recording scans.

Referring to Figures 49 to 51, Koike is seen to describe recording low-permeability black ink in a first scan and thereafter printing high-permeability color inks in subsequent scans which do not record low-permeability black ink. Thus, in the example shown in Figures 49 to 51, Koike is not seen to disclose both black image data and color image data in each of a plurality of recording scans.

Accordingly, Koike is not seen to disclose each and every aspect of the claimed invention. Therefore, for at least the foregoing reasons, Claim 1 is believed to be in condition for allowance. Further, Applicants submit that Claims 13, 25 and 26 are believed to be in condition for allowance for at least the same reasons.

The remaining claims are each dependent from the independent claims discussed above and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa,
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Respectfully submitted,


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